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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re: Crombez, et al
Serial No. 09/850,354 Group: 3683
Filed: 05/07/2001 Examiner Melody M. Burch
For: REGENERATIVE BRAKE SYSTEM ARCHITECTURE
FOR AN ELECTRIC OR HYBRID ELECTRIC VEHICLE
Attorney Docket 200-0375

APPEAL BRIEF

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STATUTES

35 U.S.C. 102(b)
35 U.S.C. 103(a)
35 U.S.C. 112
35 U.S.C. 132

OTHER

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I.
REAL PARTY IN INTEREST

The real party in interest is the Assignee, Ford Global Technologies, Inc.

II.
RELATED APPEALS AND INTERFERENCE

There are no related appeals or interferences known to the Appellants, Appellants' legal representative, or Assignee, that will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

III.
STATUS OF CLAIMS

Claims 1-4 and 7-13 are pending and remain rejected. Appellants hereby appeal the rejection of claims 1-4 and 7-13.

IV.
STATUS OF AMENDMENTS

On March 26, 2003, an amendment was filed subsequent to the final rejection. The amendment after final overcame a 35 U.S.C. § 112, second rejection of claim 12 and a 35 U.S.C. first rejection of claim 7.

V.
SUMMARY OF INVENTION

The present invention as defined in claims 1-3 provides an electric vehicle 7 shown in Figure 1.¹ The electric vehicle 7 has a first wheeled axle 10.² The first wheeled axle 10 is exclusively only electrically driven.³ The first wheeled axle 10 exclusively has only electric regenerative brakes.⁴ A second wheeled axle 22 is provided. The second wheeled axle 22 is non-driven.⁵ The second wheeled axle exclusively has only friction brakes 26.⁶

In a second embodiment hybrid electric vehicle (HEV) 17 of the present invention as defined in claim 7 and shown in Figure 2, a first axle 10 is provided which is exclusively

¹ Specification, page 4, lines 18, 19; Figure 1

² Specification page 4, line 19; Figure 1

³ Specification, page 2, lines 23-24; page 4; lines 19-20 and 27-29; Figure 1, item 10

⁴ Specification, page 2, lines 24-26; page 3, lines 9-11; page 5, lines 1-2; Figure 1

⁵ Specification, page 4, lines 29-31; Figure 1

⁶ Specification, page 5, lines 2-3; originally presented claim 1, lines 4-5 "a second wheeled axle, non-driven and with only friction brakes 26."

electrically driven and which exclusively has only electrically regenerative brakes in a manner similar or identical to that aforescribed in relation to the vehicle embodiment 7 shown in Figure 1.⁷ A second wheeled axle 32 is provided. The second wheeled axle is powered by an internal combustion engine 36.⁸ The second wheeled axle 32 exclusively has only friction brakes.⁹

A third apparatus embodiment of the present invention shown in Figures 3-5 has an HEV vehicle 27 with a first wheeled axle 10 exclusively driven by a motor generator 14.¹⁰ The first wheeled axle 10 of vehicle 27 exclusively has only electric regenerative brakes.¹¹ The vehicle 27 as noted in claim 11, additionally has a secondary electric motor generator 56 for powering the second wheeled axle 44.

In another aspect of the present invention, methods of braking electric or hybrid electric vehicles are provided. Claim 4 defines a method of braking an electric vehicle shown in Figure 1. In the method of claim 4, an electric vehicle has a first wheeled axle 10 which is exclusively electrically driven and has only electric regenerative brakes. A second wheeled axle 22 is non-driven and exclusively has only friction brakes 26. The inventive method includes sensing the headroom available for regeneratively braking the vehicle 7.¹² Power is dissipated through a thermal resistor 84 to provide additional regenerative braking for the vehicle 7.¹³

The first wheeled axle is electrically regeneratively braked to a first level.¹⁴ The second axle 22 is frictionally braked to provide a braking force upon the vehicle 7 greater than the braking force provided by the electric regenerative brakes.¹⁵

⁷ Specification, page 5, lines 16-18. (See footnotes 1-4.)

⁸ Specification, page 5, lines 18-19; Figure 2.

⁹ Specification, page 5, lines 24-26; Figure 2; originally presented claim 7, lines 4-5 "A second wheeled axle, driven by an internal combustion engine with only friction brakes."

¹⁰ Specification, page 6, lines 13-14

¹¹ Specification, page 3, lines 16-18; page 6, lines 14-17; Figure 3

¹² Specification, page 6, lines 26-28

¹³ Specification, page 6; lines 28-33; Figure 1; Figure 6

¹⁴ Specification, page 6, lines 22-23

A method of braking a hybrid electric vehicle such as that shown in Figure 2 or Figure 3 is presented by claim 12.

VI. ISSUES

The issues are *first*, whether the objection to the amendment filed 10/08/2002 is proper under 35 U.S.C. 132. *Second* (related to the first issue), a rejection of all the claims under 35 U.S.C. 112, first paragraph as containing subject matter which is not described in the specification in such a way to reasonably convey to one skilled in the relevant art, that the inventors at the time the application was filed, had possession of the claimed invention. *Third*, whether claims 1-3 are rejected under 35 U.S.C. 102(b). *Fourth*, whether claims 4 and 7-13 are patentable under 35 U.S.C. 103(a).

VII. GROUPING OF CLAIMS

Appellants contend that the claims of the present invention do not stand or fall together. In particular, the following groups of claims are patentable separately:

- | | |
|---------|-----------------------------------|
| Group 1 | Claims 1-3 stand together |
| Group 2 | Claims 7-11 stand together |
| Group 3 | Claims 4 and 12-13 stand together |

The claims in each group are separately patentable from the claims in any other group.

VIII. ARGUMENT

A. Argument Directed to the Allowance of Selected Groupings of the Claims

Claims 1-4, and 7-13 stand rejected under 35 U.S.C. 112 as containing subject matter which was not described in the specification at the time the application was filed.

Claims 1-3 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,378,053 to Patient, et al.

Claim 4 is objected under 35 U.S.C. 103(a) as being unpatentable over Patient, et al., in view of U.S. Patent 5,589,743 to King, and further in view of U.S. Patent 5,469,046 to Wong, et al.

¹⁵ Specification, page 6, lines 23-26; Figure 1; Figure 6

Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,627,438 to Barrett in view of Japanese Patent JP-11275708 (using U.S. Patent 6,120,115 to Manabe as an English equivalent).

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent 5,627,438 to Barrett, in view of Patient et al., King, and further in view of Wong, et al.

Claim 13 is rejected under the same references as Claim 12 and further in view of JP-07135701.

For reasons to appear hereinafter, claims 1-4, and 7-13 are patentable and thus, the rejections should be reversed and a notice of allowance and issue fee due should be mailed.

**1. Argument for Removal of Rejection of the Claims under
35 U.S.C. 112 due to the Objection to the 10/08/2002
Amendment under 35 U.S.C. 132**

The Examiner has objected to the amendment filed 10/08/2002 under 35 U.S.C. 132 because it introduces new matter into the disclosure. In similar fashion, the Examiner has rejected claims 1-13 as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention.

Applicants respectfully submit that the Examiner has not given the word "only" the proper interpretation as defined in the originally filed specification, claims and drawings.

In *Hockerson-Halbestadt, Inc. v. Avia Group International, Inc.*, 7/27/2000, No. 99-1505, the United States Court of Appeals for the Federal Circuit stated:

"Claim construction analysis begins with the claim language itself."

See *Karlin Tech. Inc. v. Surgical Dynamics, Inc.*, 177 F3d 968, 971, 50 USPQ2d 1465, 1467 (Fed. Cir. 1999); *Reinshaw PLC v. Marposs Societa per Azioni*, 158 F3d 1243, 1248, 48 USPQ2d 1117, 1120 (Fed. Cir. 1998).

"As a starting point, the court gives claim terms their ordinary and accustomed meaning as understood by one of ordinary skill in the art."

See *Hoechst Celanese Corp. v. BP Chems. Ltd.*, 78 F3d 1575, 1578, 38 USPQ2d 1126, 1129 (Fed. Cir. 1996) stating that the court assigns a claim term the meaning "that it would be given by persons experienced in the field of invention." *Markman v. Westview Instruments, Inc.*, 52 F3d 980, 34 USPQ2d 1330 (Fed. Cir. 1995) (en banc, aff'd 517 U.S. 370 (1996)).

A disclosure of a specification includes not only the claims and specification, but also includes the drawings. In Figures 1-3, the first axle (noted as item 10), exclusively and solely has electrical braking. Page 2, lines 15-17 of the specification reads: "It is desirable to provide an electric or HEV that can eliminate the requirement for hydraulic braking on at least one axle." Furthermore, page 2, lines 21-26 reads: "To make manifest the above delineated and other manifold desires, a revelation of the present invention is brought forth. A preferred embodiment of the present invention has a first wheeled axle which is driven by an electric motor. The electric motor also functions as a generator to provide for regenerative braking."

Within those two-noted paragraphs, Applicants have stated a desire of the invention is to provide an electric or hybrid electric vehicle which eliminates the requirement for hydraulic braking on at least one axle. It is stated that the present invention, which makes manifest the above-noted desire, has a first wheeled axle driven by an electric motor. Based on these two paragraphs, the only reasonable conclusion is that the first axle is solely braked by an electric motor.

Further buttressing the above interpretation can be found from reading page 2, lines 12-15 of the specification: "To bestow the maximum benefit which can be provided by an electric or HEV to the greatest amount of people, it is desirable that, wherever possible, components be eliminated to accordingly lower the cost of such vehicles." With that preamble appearing before the statement that it is desirable to provide an electric or HEV that can eliminate the requirement for hydraulic braking on at least one axle, the reasonable interpretation is that "only" includes its exclusive one-of-a-kind definition.

Furthermore, page 3, lines 9-11 of the specification reads: "A feature of the present invention is that there are no friction service brakes on the first wheeled axle." Therefore, since there are no friction brakes, the first axle cannot be braked at any time by friction brakes.

Page 3, lines 12-15 reads: "The vehicle configuration of the present invention serves to reduce vehicle brake system complexity and weight and can be utilized whether the first wheeled axle is the front or the rear axle of the vehicle." Having two separate types of braking systems adds weight to a vehicle.

In the summary of the invention, page 3, lines 12-13, Applicants stated that one of the purposes of the invention is to reduce brake system complexity and weight. Accordingly, to

interpret "only" as meaning a time limitation rather than an apparatus limitation is beyond a merited interpretation by anyone familiar with the claims, specification or the drawings.

The definition of "only", found in Webster's Ninth New Collegiate Dictionary is: "a: as a single fact or instance and nothing more or different"...

With regard to the use of the terms "exclusively" and "only" to the powering of the first axle, Applicants again look to the specification. On page 2, lines 23-29, Applicants' state: *A preferred embodiment of the present invention has a first wheeled axle which is driven by an electric motor. The electric motor also functions as a generator to provide for regenerative braking. The second wheeled axle of the present invention can be unpowered, powered by an ICE or alternatively, powered by an ICE and a second motor combination.*¹⁶

To one skilled in the art, it is clear that the first wheeled axle is only driven by an electric motor. This is buttressed by the fact that three configurations are given for the second wheeled axle, that of being unpowered, powered by an ICE, or powered by an ICE and a second motor combination. A review of Figures 1-3 shows the first wheeled axle with only an electric motor. Therefore, Applicants respectfully submit that a first wheeled axle with an exclusive electrically powered first wheeled axle has been shown and described.

Applicants submit that the specification, claims and drawings fully discloses the term "exclusively" and that no new matter has been added to the application.

Applicants feel that the term "exclusively" is repetitive, but has been added solely to clarify the ambiguities in relation to Applicants' invention with the cited prior art.

The Examiner has cited *Genentech, Inc. v. Chiron Corp.*, 42 USPQ2d 1608. The Examiner claims that using the terms "only" and "exclusively" lose their limiting function in combination with the use of the open-ended transitional term "comprising" used in the preamble of the independent claims. Applicants respectfully disagree with the Examiner's reading of *Genentech*.

Applicants respectfully submit that the use of the word "comprising" in the preamble is an inclusive term and that inclusive term does not disqualify Applicants' limitation in regard to the structure of the first wheeled axle. Applicants have specified one axle to be the first wheeled axle. Applicants have specified that the first wheeled axle exclusively has only

¹⁶ As used in this application, the abbreviation ICE refers to internal combustion engine. See specification, page 1, lines 15-17.

electric regenerative brakes. The word "comprising" in the preamble of the claim refers to the vehicle in total. It does not refer to the inclusion of another first axle or types of brakes (namely, friction brakes) which can be added to the first wheeled axle. Therefore, there is no conflict as stated by the Examiner. It is noted that the *Genentech* case refers to a composition of matter case, not an apparatus case comprising separate defined structures with defined limitations.

**2. Argument for Allowance of the Claims of Group 1
(Claims 1-3)**

With regard to the rejection of claims 1-3 under 35 U.S.C. 102(b) as being anticipated by Patient, et al., Applicants respectfully submit that Patient does not teach, obviate or anticipate Applicants' invention, as defined in originally submitted and/or amended claims 1-4. Nowhere does Patient et al. teach an electric vehicle wherein the first axle is exclusively only electrically driven and wherein the first wheeled axle exclusively has only electric regenerative brakes. In sharp contrast, Patient et al. (Col. 2 lines 52-57) discloses a vehicle which has friction and electric brakes. Therefore, the Patient et al. vehicle inherently has an expense which Applicants' vehicle is not burdened by.

**3. Argument for Allowance of the Claims of Group 2
(Claims 7-11)**

Claim 7 has been rejected under 35 U.S.C. 103 as being unpatentable based upon Barrett (US 5,627,438 in view of Japanese JP-11275708 (using Manabe, US 6,120,115 as an English equivalent)). Applicants respectfully submit that front wheels 10 and 12 of Manabe are not exclusively only electrically braked, but also have friction brakes noted as items 32 and 34 (Figure 3). Wheel cylinders 64 and 66 provide frictional braking for rear wheels 60,62. Accordingly, combinations relying upon Manabe fail to teach or disclose or make obvious Applicants' invention. The Examiner has referred to the phrase "the drive wheels 10,12 receive at least regenerative braking energy" found in Col 10 lines 54-55 as defining an exclusively electrically braked axle. However a more detailed review of the drawings and specifically of Figures 2,3 7&8 reveal that the term "at least" refers to that in some instances the friction brakes actuated on the front wheels 10,12 by the wheel cylinders 32 and 34 will not be initially actuated when the driver first pushed down on the brake pedal 76 (Figure 3). The term does not imply a lack of a friction brake apparatus for the front wheel but rather to a control of timing of friction brake actuation.

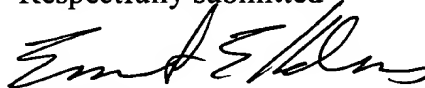
**4. Argument for Allowance of the Claims of Group 3
(Claims 4, 12-13)**

The Examiner rejected claim 4 as being unpatentable over Patient et al. in view of King and further in view of Wong et al. Applicants respectfully submit that Wong et al. is not analogous to Applicants' invention. Wong et al. relates to a transformerless low voltage switching power supply, which in column 1, relates to power supplies found in certain TV receivers as described in lines 9-10. In sharp contrast, Applicants' disclose using a thermal resistor (Figure 1 item 84) which dissipates the heat associated with a braking of the vehicle⁷. The energy involved in thermal dissipation for vehicle braking is several orders of magnitude greater than thermal dissipation in a low voltage power supply. Accordingly, Applicants respectfully submit that Wong et al. is not analogous to Applicants' invention.

**IX.
CONCLUSION**

By this submission, Applicants have shown wherein the Examiner's rejection of the claims of Group 1, 2 and 3, is improper. It is respectfully requested that the Board reverse the Examiner's rejection of all pending claims, and hold that the claims are not rendered anticipated or obvious, taken singularly or in combination with any other cited reference.

Respectfully submitted



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Dated: October 27, 2003

CERTIFICATE OF MAILING

I hereby certify that this Appeal Brief pursuant to 37 C.F.R. 1.192 is being deposited in triplicate with the United States Postal Service as first class mail under 37 C.F.R. 1.8 on October 27, 2003 and is addressed to the Board of Patent Appeals and Interferences, Assistant Commissioner for Patents, Washington, D.C. 20231.



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09/850,354
Attorney Docket No. 200-0375

X.
APPENDIX – ITEM A
CLEAN COPY OF CLAIMS 1-4; 7-13

1. An electric vehicle comprising:
 - a first wheeled axle exclusively only electrically driven, said first wheeled axle exclusively having only electric regenerative brakes;
 - a second wheeled axle, which is non-driven, and said second wheeled axle exclusively having only friction brakes.
2. An electric vehicle as described in claim 1, wherein said first wheeled axle is a front axle.
3. An electric vehicle as described in claim 1, wherein said first wheeled axle is a rear axle.
4. A method of braking an electric vehicle which has a first wheeled axle exclusively electrically driven, said first wheeled axle exclusively having only electric regenerative brakes, and a second wheeled axle which is non-driven, said second wheeled axle exclusively having only friction brakes, said method comprising:
 - sensing a headroom available for regeneratively braking said vehicle; and
 - dissipating power through a thermal resistor to provide additional regenerative braking for said vehicle;
 - electrically regeneratively braking said first axle to a first level; and
 - frictionally braking said second axle to provide a braking force upon said vehicle greater than a braking force provided by said electric regenerative brakes.
7. A vehicle comprising:
 - a first wheeled axle electrically driven, said first wheeled axle exclusively having only electric regenerative brakes; and
 - a second wheeled axle driven by an internal combustion engine, said second wheeled axle exclusively having only friction brakes.

8. An electric vehicle as described in claim 7, wherein said internal combustion engine can additionally compression brake said second wheeled axle.

9. A vehicle as described in claim 7, wherein said first wheeled axle is a front axle.

10. A vehicle as described in claim 7, wherein said first wheeled axle is a rear axle.

11. A vehicle as described in claim 7, additionally having a secondary electric motor generator for powering said second wheeled axle.

12. A method of braking a vehicle having a first wheeled axle exclusively electrically driven, said first wheeled axle exclusively having only electric regenerative brakes, and said vehicle having a second wheeled axle driven by an internal combustion engine, said second wheeled axle exclusively having only friction brakes, said method comprising:

monitoring a headroom of regenerative braking available and dissipating power through a thermal resistor to make more headroom available for regenerative braking;
electrically regeneratively braking said first wheeled axle up to a first level;
and

frictionally braking said second wheeled axle when a braking requirement of said vehicle is above said first level.

13. A method of braking a vehicle as described in claim 12, additionally comprising compression braking said first wheeled axle with said internal combustion engine up to said first level and above said first level of braking said vehicle.